

WHAT IS CLAIMED IS:

1. A sign display panel comprising:  
  
a controller connected to a set of display units, the controller comprising a central processing unit and a memory for storing controller software configured for execution by the central processing unit wherein the controller software comprises instructions for sending a message to at least one of the set of display units; and  
  
each one of the display units comprising a central processing unit and a memory for storing display unit software configured for execution by the central processing unit wherein the display unit software comprises instructions for detecting an error in the message and, if the error is detected, sending an error message to be received by the controller.
2. The sign display panel of claim 1 wherein the display unit software comprises instructions for detecting errors in parity.
3. The sign display panel of claim 1 wherein the controller software further comprises instructions for determining which one of the display units sent the error message.
4. The sign panel of claim 3 wherein the controller software determines which of the set of the display units sent the error message based on an integer associated with the error message.

5. The sign panel of claim 4 wherein the integer indicates a position of the one display unit that sent the error message relative to each other display unit of the set of display units.

6. A method of sign display panel communication wherein the sign display panel comprises a controller and a set of display units, the method of communication comprising:

sending a message from the controller to at least one of the set of display units;

receiving the message at the at least one of the set of display units; and

sending an indication of the error from the one display unit to be received by the controller if any of the at least one display units detects an error in the message.

7. The method of claim 6 further comprising determining which one of the set of display units sent the indication.

8. The method of claim 7 further comprising determining which of the display units sent the indication based on an integer associated with the indication.

9. A display unit configured for use in a sign display panel comprising a controller electrically connected to a set of display units, the display unit comprising:

a central processing unit;

an interface for receiving a message sent by the controller; and

memory for storing display unit software configured for execution by the central processing unit, wherein the display unit software comprises instructions for detecting an error in the message and, if the error is detected, sending an error message to be received by the controller.

10. The display unit of claim 9 wherein the display unit software comprises instructions for detecting errors in parity.

11. The display unit of claim 9 wherein the display unit software further comprises instructions for determining if the message is at least one of a communication integrity message, a global message, or a local message.

12. The display unit of claim 11 wherein the display unit software further comprises instructions for executing the message if the message is a global message.

13. The display unit of claim 11 wherein the display unit software further comprises instructions for reading an address byte of the message if the message is a local message.

14. The display unit of claim 13 wherein the display unit software further comprises instructions for executing the message if the address byte is 0 or decrementing the address byte and sending the message to another display unit if the address byte is greater than zero.

15. A method of sign display panel communication, wherein the sign display panel comprises a controller electrically connected to a set of display units, the method comprising:

setting a timer to a time interval;

receiving a series of communication integrity messages from the controller;

resetting the timer to the time interval upon receipt of each of the plurality of communication integrity messages; and

sending an error message to be received by the controller when the timer expires after the time interval.

16. A display unit configured for use in a sign display panel comprising a controller electrically connected to a set of display units, the display unit comprising:

a central processing unit;

a timer set to a time interval;

an I/O interface for receiving a series of communication integrity messages from the controller; and

memory for storing display unit software configured for execution by the central processing unit, wherein the display unit software comprises instructions for resetting the timer to the time interval upon receipt of each of the series of communication integrity messages and, if the

timer expires, generating an error message to be received by the controller.

17. The display unit of claim 16 wherein the error message comprises an indication of which display unit sent the error message.

18. A method of sign display panel communication, wherein the sign display panel comprises a controller electrically connected to a set of display units, the method comprising:

sending a series of communication integrity messages to the set of display units;

receiving a message from at least one of the set of display units in response to each of the series of communication integrity messages; and

determining if the message indicates a communication error.

19. The method of claim 18 further comprising determining a location of the communication error based on the error message if the message indicates a communication error.

20. The method of claim 19 wherein the error message is an integer corresponding to a display unit that sent the error message.

21. The method of claim 18 further comprising:

setting a timer to a time interval upon sending each of the communication integrity messages; and

initiating a diagnostic utility if the timer expires before receiving the message.

22. A controller configured for use with a sign display panel comprising the controller connected to a set of display units, the controller comprising:

a central processing unit;

an I/O interface for sending a series of communication integrity messages to at least one of the set of display units; and

a memory comprising controller software configured for execution by the central processing unit wherein the controller software comprises instructions for determining an error in the communication network based on a message received in response to each of the series of communication integrity messages.

23. The controller of claim 22 further comprising a timer set to a time interval, wherein the controller software further comprises instructions for resetting the timer to the time interval upon sending each of the series of communication integrity messages and initiating a diagnostic utility if no message is received before the timer expires.

24. The controller of claim 22 wherein the instructions for determining further comprise determining a location of the error based on the message.

25. The controller of claim 24 wherein the message comprises an integer associated with a display unit that sent the message and the instructions for determining a location of the error further comprise determining the display unit that sent the indication based on the integer.

26. A set of sign display panel elements connected in a serial communication network wherein each element receives messages from a previous adjacent element and sends messages to a subsequent adjacent element, the set of elements comprising:

a controller comprising a central processing unit and a memory comprising controller software configured for execution by the central processing unit wherein the controller software comprises instructions for sending a series of communication integrity messages to the communication network; and

a set of display units wherein each one of the display units comprises:

a timer set to a time interval;

a central processing unit; and

a memory for storing display unit software configured for execution by the central processing unit wherein the display unit software comprises instructions for resetting the timer to the time interval upon receipt of each of the series of communication integrity messages and, if the

timer expires, sending an error message to the communication network to be received by the controller.

27. The set of sign display panel elements of claim 26 wherein the controller software further comprises instructions for determining a display unit that sent the error message based on the error message.

28. The set of sign display panel elements of claim 27 wherein the error message comprises an integer greater than a total number of the set of display units and each display unit that receives the error message from the communication network decrements the integer.

29. A system for sign display panel communication wherein the sign display panel comprises a controller and a set of display units, the system of communication comprising:

means for sending a message from the controller to at least one of the set of display units;

means for receiving the message at the at least one of the set of display units;

and

means for sending an indication of the error from the one display unit to be received by the controller if any of the at least one display units detects an error in the message.